

“Sleeping Disorder Among Children Under 15 Years Of Age Due To Usage Of Mobile Phones In Karachi, Sindh, Pakistan”

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Abstract

Objectives: The study aims to determine the association between sleeping disorders and mobile phone usage among children under 15 years of age in Karachi, Pakistan.

Methods: The community-based observational cross-sectional study is conducted in Clifton, Karachi, Pakistan. A sample of 492 children was included in the study using simple random sampling in the schools of the study area. The data was collected on a structured questionnaire during a face-to-face interview with parents of under 15 years children and after the reopening of the school the interviews from students in schools in the study area. The data were entered, cleaned, and analyzed in SPSS version 25 software. The bivariate analysis was carried out to find out the association between the dependent and independent variables, and regression is used to control the confounding effects at a 95% confidence interval.

Results: The result showed that 56.9% of children having sleeping disorders and children using a mobile phone are 2.46 times higher at risk of sleeping disorders. The study also revealed that children who own mobile phones are 3.7 times more at risk of a sleeping disorder. The children who prefer to play outside were 19% less at risk of a sleeping disorder.

Conclusion: The research has concluded that children under the age of 15 with habitual mobile phone usage are found to suffer from one or more types of sleeping disorders. From hours of sleeping in the daytime to insomnia, all these symptoms have been considered among the leading sleeping disorders among children who have been using mobile phones excessively. The problem is significant as it is impacting child physical health and they are facing health challenges of obesity.

Keywords: Sleeping disorder, Children, Mental health, Physical health, Karachi, Pakistan

Introduction

Sleeping disorders become a public health issue, and they affected around 50 to 70 million in the United States. Sleeping disorder is a kind of abnormal sleep behavior that includes restless leg syndrome, insomnia, sleep apnea, and narcolepsy. Further, chronic sleep disorder increases the risk of hypertension, obesity,

diabetes, stroke, depression, and cardiovascular [1]. Sleep disorders involve problems with the quality, timing, and amount of sleep, which result in daytime distress and impairment in functioning. Sleep disorders often occur along with medical conditions or other mental health conditions, such as depression, anxiety, or cognitive disorders. Sleep is an important

component of a person's health, and someone needs to change with their age. Sleep patterns are important to function like other body functions. In this study, a disorder of sleeping means sleeping once per day for between 6 to 8 hours. However, the pattern that is most common in a population may or may not be the healthiest option for people [2]. The problem occurs due to promote of electronic media, and children commonly use these devices, which is affecting their sleep routines. Electronic devices may impair the sleep cycle and further impact the child's emotional, cognitive, or physiological. Child displacement constantly and the bright lights of the phone can negatively impact their health and quality of sleep [3]. Mobile phones were introduced a few decades ago for communication purposes and to reduce the challenges people were facing while communicating information. However, significant development has been observed in smartphone as it becomes multi-functional, and their memory capacity is increased. Further, people can use the internet in it and use the mobile phone in their daily routine. However, the excessive use of mobile phones is impacting individual health negatively. Health issues are raised because mobile phones give exposure to radiofrequency electromagnetic fields and these frequencies and radiation further impact the environment. Psychological challenges are quite common due to the usage of mobile as per observations as it is impacting the behavior of a person [4]. However, sleep is crucial as it plays a role in the development of psychology. Also, sleep influences a child's physical development which is further connected with daily routine activities. Sleep disturbance led to adverse mental and physical consequences, and its outcomes are poor diet, reduced immunity, stunted growth, further mental challenges suicidal tendencies, stress, and depression. Sleeping issues mainly arise due to light-emitted devices and the usage of electronic devices. Screen time of children is increasing significantly which is impacting health and its magnitude has a potential association with the health of people. The challenges can be reduced

by avoiding the usage of a device before sleeping time as it positively impacts the mind of a child [5]. In several previous studies conducted across the world, it has been observed that children under 15 years old become addicted to mobile phones. Excessive screen time and usage of a mobile phone before sleep time is common practice among adolescents and children in big cities in Pakistan. This habit might impact children's mental health and day-to-day activities, which can raise challenges for the parents. Therefore, this study is planned to investigate the effects of mobile phone use among children. The study aims to determine the association between sleeping disorders and mobile phone usage among children under 15 years of age in Karachi, Sindh, Pakistan.

Methods

Study Design & Population

To address the hypothesis, we have conducted a community-based cross-sectional study design. In this research design, the prevalence of the sleeping disorder in children under 15 years of age is assessed against mobile phone usage in the study population. The structured questionnaire was used to collect data during face-to-face interviews with parents of under 15 years children and after the reopening of the school the interviews from students in schools of the study area. The study has been carried out in population of Clifton, Karachi, Pakistan. The eligibility criteria are set to get information from the appropriate candidates. For the present study, the criteria are parents must have a child whose age should be under 15. Those children who can use mobile phones and they have access to mobile phones i.e., their parents can afford the mobile phone either the smartphone or (non-smartphones) are included in the study.

Sample Size and Technique

The sample size of the present study is 492, and sampling techniques used, as in the first stage purposive sampling used for the study area selection, which is identified in resident areas of the Clifton i.e., Schools, Apartments,

buildings, and houses. The simple random sampling techniques are using to identify the individuals from the list of houses. The sample size calculated by EPI info Software, based on 34% sleeping disorder prevalence [6], 95% Confidence Interval, 5% error margin, and design effect 1.5, and 80% power. The research conducted a survey strategy and captured information through a close-ended questionnaire to gather data. The filled questionnaires were checked for completeness at the end of each day. The questionnaires were entered in excel based database daily and checked for completeness and accuracy, the error was communicated to the data collection team regularly for correction. Data management is one of the critical parts as in this researcher need to manage raw data, and it cannot be shared with anyone due to ethical issues. In the present study, the research managed the data and did not involve anyone. The researcher gathered data physically and

store the complete data in the excel sheet for further testing.

Data Analysis Plan

Data analysis is one of the important parts as it helps in concluding the findings of the study systematically. The software that is considered for quantitative analysis is SPSS. The data is entered in excel and further analyzed through the SPSS version 25. Firstly, the demographics of the study was analyzed and then move towards reliability. The reliability of each variable has been derived, and to accept the hypothesis of the research, and conducted by ANOVA analysis. The proportion and frequency are computed by descriptive analysis, the odds ratios are calculated to check the association among independent variables and sleeping disorders. These variables with a p-value \leq of 0.05 were included for multivariate analysis to determine the risk factors linked to the outcome variables.

Results:

| Variable | Number | % |
|--|--------|------|
| Gender | | |
| Male | 300 | 61 |
| Female | 192 | 39 |
| Father's occupation | | |
| Private Job | 321 | 65.2 |
| Govt Job | 80 | 16.3 |
| Others | 91 | 18.8 |
| Mother Occupation | | |
| House Wife | 381 | 77.4 |
| Govt Job | 41 | 8.3 |
| Private Job | 70 | 14.2 |
| Child Age | | |
| 1-5 year | 108 | 22.0 |
| 6 to10 year | 209 | 42.5 |
| 11 to 15 Year | 175 | 35.6 |
| Environmental Factor | | |
| Nearby Park or play ground | 306 | 62.2 |
| Child goes to nearby playgrounds | 218 | 44.3 |
| Room allocated for play in home | 147 | 29.9 |
| Ownership of mobile phone | | |
| Child has own mobile phone | 140 | 28.5 |
| If no, whose mobile phone is used by the child? | | |
| Father | 102 | 20.7 |
| Mother | 352 | 71.5 |
| Others | 38 | 7.7 |
| Which application does child use mostly? | | |
| Cartoon | 394 | 80.1 |
| Games | 79 | 16.1 |
| Others | 19 | 3.8 |
| Do you have Wi-Fi/internet in your house? | | |
| Houses with Wi-Fi | 369 | 75.0 |
| Which social application uses the child? | | |
| WhatsApp | 126 | 25.6 |
| Facebook | 69 | 14.0 |
| Instagram | 20 | 4.1 |
| Tiktok | 35 | 7.1 |

Table 1: Descriptive characteristics of parents and children under 15 years of age included in the study in Karachi, Sindh, Pakistan.

Descriptive characteristics of study participant:

In the study 60.98% of participants were male and the remaining were female. It is observed that around 65% of fathers of the study participants were doing private jobs, however, 77.44% of mothers were housewives and only 22.6% were working women in the study populations. The nearby playground availability was for 62.3% participants, whereas, out of them 44.3% children were going to playground for physical activities. However, 29.9% respondent has allocated area in house for children as play area, while more than half did not have this facility at home. In

study, population children have 28.5% having own phone, who did not have mobile phone they use 71.5% of mother's, 20.7% father's phone. Among the study population 80% use to watch cartoons, 16% games, 1.6% picture galleries in the mobile, while 2.2% used for other purpose. In study population, 75% has the Wi-Fi/internet in their homes and 45.7% respondents are using social applications, while 44.3% responded they don't use any application in mobile phone. The application usage follows 25.6 WhatsApp, 14% Facebook, and 7.1% Tiktok. Table 1 shows details of socio-demographic characteristics of study participants.

| Variable | n | % |
|---|-----|------|
| Is the Child facing the issue of sleeping disorder? | | |
| Yes | 280 | 56.9 |
| If yes, which type of sleeping disorder? | | |
| Sleep timing | 180 | 36.6 |
| Sleeping duration | 100 | 20.3 |
| Other | 212 | 43.1 |
| How many hours do children sleep at night? | | |
| 2-3hour | 44 | 8.9 |
| 4-6 hour | 248 | 50.4 |
| 7-8 hour | 107 | 21.7 |
| >8 hour | 93 | 18.9 |
| How many hours do children sleep in the daytime? | | |
| <2 hour | 340 | 69.1 |
| 2-3hour | 128 | 26.0 |
| 4-6 hour | 24 | 4.9 |
| Reason for allowing the use of the mobile phone to a child | | |
| Not allowed | 89 | 18.1 |
| Housework disturbance | 121 | 24.6 |
| Working woman | 213 | 43.3 |
| No time | 10 | 2.0 |
| online classes | 59 | 12.0 |

Table 2: Prevalence of Sleeping Disorder among children under 15 years of age in Karachi, Sindh, Pakistan.

Prevalence of the sleeping disorder:

In the study population, it was observed that 56.9 % children having sleeping disorder, however, 36.6% children were facing problem of with sleep timing i.e., reduced number of hours of sleeping, while 20.3% children had problem of sleeping duration. The study also shown that 50.4% of the study population (children) were sleeping for 4-6 hours (less than normal hours) followed by 21.7% for 7-8 hours (normal hours), 18.9% more than 8 hours and

8.9% for 2-3 hours at night only. It was observed that 24.6% children allowed using mobile due to avoid in disturbance in household work by parents, 43.3% due to mothers were working outside in offices and do not have time at daytime, 12% due to online classes due to closure of schools, and 2% allowed as parents have lack time to spend with their children due to busy schedule. Furthermore, Prevalence of Sleeping Disorder among children under 15 years of age in Karachi details are given in Table 2.

| Variable | Number | % |
|---|--------|------|
| School Performance of the child | | |
| Good | 200 | 40.7 |
| Average | 245 | 49.8 |
| Not satisfied | 15 | 3.0 |
| Not going School | 32 | 6.5 |
| Child prefer to play with | | |
| Toys | 160 | 32.5 |
| Outside with friends | 332 | 67.5 |
| How much time using the mobile at home | | |
| Between 1 to 2 hours | 160 | 32.5 |
| More than 2 hours | 332 | 67.5 |

Table 3: Sleeping disorder impact on children under 15 years of age in Karachi, Sindh, Pakistan.

Child preferences and impacts:

In study population the children performance in school were asked from parents, and 40.7% responded as good performance in school, 49.8 as average performance in school, and 3% unsatisfactory performance in school. While it was observed the 32.5% children preferred to play with toys at home and 67.5% to go outside

with friends for play. However, it was observed also observed that 32.5% study population using mobile for 1 to 2 hours while 67.5% more than 2 hours. Furthermore, Sleeping disorder impact on child under 15 years of age in Karachi, Pakistan. detail given in table 3.

Association Socio-economic risk factors with sleeping disorder:

Table 4: Association with Socio-Economic variables with sleeping disorder

| Variable | Odd ratio | Upper CI | lower CI | P-value |
|---|-----------|----------|----------|---------|
| Child Gender | | | | |
| Male | 0.909 | 0.630 | 1.311 | 0.641 |
| Female | | | | |
| Child Age | | | | |
| 1 to 5 | 0.979 | 0.601 | 1.592 | 0.931 |
| 11 to 15 | 1.167 | 0.729 | 1.866 | 0.52 |
| 6 to 10 | 0.714 | 0.512 | 1.34 | 0.085 |
| Fathers Occupation | | | | |
| Private Job | 1.616 | 0.945 | 0.983 | 0.597 |
| Govt. Job | 1.931 | 0.529 | 1.173 | 0.713 |
| Business men | 1.487 | 0.111 | 0.18 | 0.022** |
| Mother Occupation | | | | |
| House Wife | 2.112 | 0.29 | 1.094 | 0.567 |
| Govt. Job | 2.312 | 0.788 | 2.569 | 0.567 |
| Private Job | 1.139 | 0.136 | 0.66 | 0.383 |
| Is there any nearby park or Playground? | | | | |
| No | 1.5 | 0.587 | 1.757 | 0.523 |
| Does the child go to nearby parks / playgrounds? | | | | |
| No | 1.465 | 1.014 | 2.115 | 0.042** |

The results shown significant association of the variables like gender, age, family occupation, and availability of the playground. Other variable did not show significant association with sleeping disorder. Furthermore, 10% males are at less risk of the sleeping disorder in comparison to female participants. The age group between 11 to 15 shown higher risk of 1.16 time's greater risk than other age groups. The Mother's working status has shown higher risk of sleeping disorder in children as

compared to non-working mother. The children who do not have availability of playground around the house or play area were 1.5 times higher risk of having sleeping disorder. Table 4 shows association of independent variables with sleeping disorders among children under 15 years of age.

Association of sleeping disorder with social network usages:

Table 5: Association of social network usage with sleeping disorders among children under 15 years of age in Karachi, Sindh, Pakistan.

| Variable | Odd ratio | Lower CI | Upper CI | P-value |
|---|-----------|----------|----------|----------|
| Which application does child use mostly? | | | | |
| Cartoon | 2.362 | 1.44 | 3.874 | 0.001** |
| Games | 1.20 | 0.56 | 1.430 | 0.999 |
| Picture Galleries | 4.068 | 1.063 | 15.571 | 0.04** |
| Which social application uses the child? | | | | |
| WhatsApp | 1.905 | 0.974 | 3.724 | 0.060 |
| Facebook | 1.773 | 0.600 | 5.236 | 0.300 |
| Instagram | 0.441 | 0.160 | 1.210 | 0.112 |
| TikTok | 1.682 | 0.495 | 5.723 | 0.405 |
| Other | 2.043 | 1.299 | 3.212 | 0.120 |
| School Performance of child | | | | |
| Good | 0.762 | 0.177 | 0.981 | 0.003** |
| Average | 1.000 | 0.235 | 4.253 | 0.104 |
| Not satisfactory | 2.000 | 0.470 | 8.505 | 0.056 |
| Child prefer to play with | | | | |
| Toys | 0.612 | 0.418 | 0.895 | 0.012** |
| Outside with friends | | | | |
| Is child using mobile phone | | | | |
| Yes | 2.46 | 1.1 | 5.45 | <0.001** |
| Does the child has own mobile phone? | | | | |
| Yes | 3.722 | 2.372 | 5.839 | <0.001** |

In the study results shows that the children are using application have association with sleeping disorder. The children watching the picture galleries in mobile phone are at 4 times higher risk of getting sleeping disorder followed by the children who are watching cartoons 2.3 times more at risk of developing sleeping disorder. The children using the social applications like WhatsApp, Facebook, Instagram, and TikTok were also at higher risk of developing the sleeping disorder as compare non-users. WhatsApp users are 1.9 times more at risk of facing issue of sleeping disorder followed by Facebook 1.7 times and TikTok 1.68 times more at risk of sleeping disorder.

The children have good school performance were found 23.8% less at risk of sleeping disorder, while the children with unsatisfactory school performance were 2 times higher at risk of sleeping disorder. The children who prefer to play outside with friends were 38.8% less at risk of sleeping disorder. The children who have own mobile phone were 3.722 times more at risk of sleeping disorder. The children who were using mobile phone were 2.46 times more at risk of sleeping disorder. Table 5 shows the association of social network usage with sleeping disorders among children under 15 years of age in Karachi, Pakistan.

| Association of Sleeping Disorder | | | | |
|---|-----------------------|-------------------|-------------------|---------|
| Child using mobile phone | | | | |
| | Adjusted Odd ratio | Lower CI limit | Upper CI Limit | P-value |
| Yes | 2.46 | 1.1 | 5.45 | <0.001 |
| Child own mobile phone | | | | |
| Yes | 3.722 | 2.372 | 5.839 | <0.001 |
| Child Prefer to play | | | | |
| Child prefer to play outside with friend | 0.812 | 0.418 | 0.895 | <0.001 |

Table 6: Multivariate analysis showing association of independent variables with sleeping disorder among children under 15 years of age in Karachi, Sindh, Pakistan.

Multivariate Analysis for significant association

The multivariate analysis was carried to exclude the confounding effect on the association among independent variable and dependent variable. The multivariate analysis drawn from bivariate analysis; the variables statistically significant at p-value <0.05 were selected for multiple regression model of the adjusted odd ratios. All risk factors with p-value <0.05 were simultaneously run regression and backward selection used to eliminate the risk factor with very high value. Total nine variable run in the regression model and three variables have shown significant association at p-value less than 0.05 after adjusted. The adjusted odd ratio shows that children using the mobile phone are 2.46 times higher at risk of sleeping disorder. The study also revealed that the children have own mobile phones are 3.7 times more at risk of the sleeping disorder. The children prefer to play outside were 19% less at risk of the sleeping disorder. Table 6 shows the results from multivariate analysis showing the association of different independent variables with sleeping disorder among children under 15 years of age in Karachi, Pakistan.

Discussion

As per secondary sources multiple study were studies, and the sleeping disorder problems are quite common due to excessive screen time and usage of a mobile phone before sleep time. As

per finding from one of study that it has been observed that children under 15 years old become addicted to mobile phones. This impacts their mental health and day-to-day activities, which can raise challenges for the parents [7]. As per the study, it has been concluded that children are likely to use multiple electronic devices, which include television, mobile phones, electronic games, etc. and the use is regular and excessive. The child can get access to any application quickly with the help of the google play store, which has been an increasing challenge for the parents [8].

As per this study, it has been observed that usage of mobile among children under age 15 is increased significantly, and about 95% of the population have accessed mobile phones. The user cannot be tracked by parents each day because of which issues of the sleeping disorder become common among children [10]. As per a study finding, the child can access the mobile phone of multiple people in the household, such as mother, father, sister, uncle, grandfather, grandmother, aunt. Also, the Clifton, Karachi children have been using mobile phones for multiple purposes such as games, cartoons, picture galleries, etc. Further, challenges are raised because most of the population have Wi-Fi at their places, which helps children download new games and easily access them. However, as per secondary analysis, it has been observed that there are multiple reasons for a

sleeping disorder, such as child sleep on uneven times, which impact their night sleep and leads to the sleeping disorder. The sleeping disorder also impacts the child's eating habits, and they start facing problems like insomnia from a very young age [11].

Similarly, considering literature, the sleeping disorder is raised among the youth because there is no balance in their lives, which raises specific problems such as excessive hunger, eating disorder, obesity, lack of attention, socializing problems, etc. It has been concluded that in the current era, the child can face moderate to excessive sleeping disorder and the common reason behind it is screen time [12]. As per the study multiples challenges are raised due to sleeping disorders such as eyesight problems, weight gain, and loss, aggressiveness, absent mind no appetite. Furthermore, in the current era, the child has been using social media platforms from a very young age, due to which issues are increasing. An application that child is commonly using includes WhatsApp, Facebook, Instagram, Twitter, WeChat, TikTok, Imo, and Tik Tok. As per secondary analysis, the challenges are raised because parents cannot control their children and do not have any schedule. The child is misusing technology as they are playing games excessively, which is one of the primary reasons for the sleeping disorder [13]. The excessive usage of the mobile lead towards sleeping disorder and in some cases, it impacts badly on the mental health. When children use excessive mobile phones from a very young age, it can impact their brain development, which leaves a long-run impact on their lives [14].

The impact of improper sleeping and lack of rest caused by mobile phone usage to the extent of addiction causes the children to miss out on vital hours of sleep [15]. Considering this, the parents who have been a part of this study show interest in marking excessive mobile phone use to have disturbed the sleeping cycle of their kids. Primary data finding suggests the children, who are mostly in the age group of 15

or below to stay up to the later of night and wake late in the morning [16]. Furthermore, this supports the findings of many researchers who associate mobile phone use at night with daytime sleepiness [17]. The effective analysis supports the secondary effects of such sleeping disorders in the daily lives of children. From slowed cognitive functions, laziness, and a whole lot of other problems emerging during later ages, children must be restricted from excessive mobile phone use [18]. This study showed most of the mothers that were involved in the study were housewives. This helps them remain in contact with their children more than mothers who go out for a job.

Conclusion

The rising concerns amongst the global populous to get hold of how the cellphone has been a cause of concern disguised as a blessing has led to its unprecedented usage. This has especially been a problem for people, precisely those parents with children in their early teenage, about 15 years or a couple of years younger. The study in focus was conducted with the audience being the parents of children under 15 in Pakistan. As we conclude, it becomes evident that parents in the country have similar concerns as to those globally when it comes to the detrimental effects of excessive usage of mobile phones. The study concluded that children under the age of 15 with habitual mobile phone usage are found to suffer from one or more types of sleeping disorders. From hours of sleeping in the daytime to insomnia, all these symptoms have been considered amongst the leading sleeping disorders amongst kids who have been using mobile phones excessively. This conclusively associates sleeping disorders and unchecked mobile phone usage amongst children under the age of 15. From unrestricted access to mobile phones and excessive nighttime scrolling, mobile phone applications cause children to lose the sleeping order and stay awake for hours during the night. Among the many other sleeping disorders and problems, this excessive usage also has a secondary effect: the all-over physical and

mental health of children at such a growing age. Both the literature and primary data have led to the findings that positively relate to sleeping disorders and mobile phone usage. Dominating the children's mental and social life, mobile phone usage has put them into social distancing, thus causing various sorts of disorders. However, with the study's focus on sleeping disorders, mobile phone usage has been positively linked with the rising concerns with excessive mobile phone use. This study have concluded that mobile phone usage is maintained only for leisure and, when necessary, can help parents with this pressing problem of excessive mobile phone usage and the sleeping disorders associated with it.

Recommendations have been extracted from the finding derived after the comparative analysis of both literature and from this study.

Friendly restrictions can help children understand and increase their diligence to control the usage of mobile phones. The restrictions can help children develop the lost natural sleeping order back with reduced daytime sleeping problems.

Counseling helps the parents educate their children over the adverse effects of constant mobile phone usage. Counseling here could be anything from friendly chat to proper factual basics added to a parent-child talk. This increases the chances of the child understanding the problems associated with their then habits.

Parents can help children learn a whole lot by setting up examples – That's exactly how they can help, with practices of using mobile phones only when necessary, limiting its leisurely use and thus setting an example for the children to follow.

While the recommendations might sound basic but a major dent in cell phone use can help the youngsters return to a normal sleeping schedule and find better health.

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